

WHAT IS CLAIMED IS:

1. A composition comprising one or more biomolecule(s) covalently attached to a polymer-coated solid support, wherein the attachment is by 2 + 2 cycloaddition between a reactive site present on said polymer and a reactive site present on said biomolecule(s).  
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2. The composition of claim 1, wherein the polymer is a polymer or copolymer made of at least two co-monomers wherein at least one of said co-monomers can react via 2 + 2 photo cycloaddition.  
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3. The composition of claim 1, wherein the polymer is a polymer or copolymer that has been chemically modified to contain a reactive group that undergoes 2 + 2 photo cycloaddition.  
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4. The composition of claim 1, wherein the solid support is a material selected from the group consisting of nylon, polystyrene, glass, latex, polypropylene, and activated cellulose.
- 20 5. The composition of claim 1, wherein the solid support is a material selected from the group consisting of a bead, membrane, microwell, centrifuge tube, and slide.
6. The composition of claim 1, wherein the reactive site present on the polymer and/or the reactive site present on the biomolecule(s) contains an electron deficient alkene group.  
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7. The composition of claim 1, wherein the reactive site present on the polymer and/or the reactive site present on the biomolecule(s) are selected from the group consisting of dimethyl maleimide, maleimide, thymine, polythymine, acrylate, cinnamate, and citraconimide.  
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8. The composition of claim 1, wherein said biomolecule(s) comprise a nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

5 9. A composition comprising one or more biomolecule(s) covalently attached to a solid support, wherein the attachment is by 2 + 2 cycloaddition between a reactive site present on the solid support and a reactive site present on the biomolecule(s).

10 10. The composition of claim 9, wherein the solid support is a material selected from the group consisting of nylon, polystyrene, glass, latex, polypropylene, and activated cellulose.

11. The composition of claim 9, wherein the solid support is a material  
15 selected from the group consisting of a bead, membrane, microwell, centrifuge tube, and slide.

12. The composition of claim 9, wherein the solid support has been treated with a coupling agent to attach amine groups to its surface, and said reactive site  
20 present on the solid support is attached to said solid support by the amine groups.

13. The composition of claim 9, wherein the reactive site present on the solid support and the reactive site present on the biomolecule(s) are selected from the group consisting of dimethyl maleimide, maleimide, thymine, polythymine, acrylate, cinnamate, and citraconimide.  
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14. The composition of claim 9, wherein said biomolecule(s) comprise a nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

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15. In an improvement of a method for attaching one or more biomolecule(s) to a polymer hydrogel or hydrogel array, said improvement

comprising attaching said biomolecule(s) to said polymer hydrogel or hydrogel array using a 2 + 2 photocycloaddition reaction.

16. The method of claim 15, wherein said biomolecule(s) comprise a  
5 nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

17. In an improvement of a method for attaching one or more  
biomolecule(s) to a solid support, said improvement comprising attaching said  
10 biomolecule(s) to said solid support using a 2 + 2 photocycloaddition reaction.

18. The method of claim 17, wherein the solid support is a material  
selected from the group consisting of nylon, polystyrene, glass, latex, polypropylene,  
and activated cellulose.

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19. The method of claim 17, wherein the solid support is a material  
selected from the group consisting of a bead, membrane, microwell, centrifuge tube,  
and slide.

20. The method of claim 17, wherein said biomolecule(s) comprise a  
nucleic acid fragment containing less than about 1000 nucleotides, and further  
optionally comprise a spacer region.

21. In an improvement of a method of manufacturing polymer hydrogel  
25 arrays, said improvement comprising simultaneously crosslinking said polymer hydrogel and attaching one or more biomolecule(s) to said hydrogel using a 2 + 2 photocycloaddition reaction.

22. The method of claim 21, wherein said biomolecule(s) comprise a  
30 nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

23. A method for preparing a crosslinked polyacrylamide hydrogel or hydrogel array comprising one or more attached biomolecule(s), said method comprising:

- 5 (a) obtaining a polyacrylamide reactive prepolymer that includes one or more reactive site(s) capable of 2 + 2 photocycloaddition;
- (b) placing said polyacrylamide reactive prepolymer on a solid support;
- (c) crosslinking said polyacrylamide reactive prepolymer to obtain a crosslinked polyacrylamide hydrogel or hydrogel array;
- 10 (d) obtaining one or more biomolecule(s) that includes one or more reactive site(s) capable of 2 + 2 photocycloaddition; and
- (e) contacting the product of step (c) with the product of step (d) under conditions sufficient for 2 + 2 photocycloaddition to occur such that said crosslinked polyacrylamide hydrogel or hydrogel array comprising one or more attached biomolecule(s) is obtained.

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24. The method of claim 23, wherein the reactive site(s) present on the polyacrylamide reactive prepolymer and the reactive site(s) present on the biomolecule(s) are selected from the group consisting of dimethyl maleimide, maleimide, thymine, polythymine, acrylate, cinnamate, and citraconimide.

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25. The method of claim 23, wherein said biomolecule(s) comprise a nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

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26. The method of claim 23, wherein said crosslinking is done by 2 + 2 photo cycloaddition between one or more reactive site(s) of said polyacrylamide reactive prepolymer.

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27. A method for preparing a crosslinked polyacrylamide hydrogel or hydrogel array comprising one or more attached biomolecule(s), said method comprising:

- (a) obtaining a polyacrylamide reactive prepolymer that includes one or more reactive site(s) capable of 2 + 2 photocycloaddition;
- (b) placing said polyacrylamide reactive prepolymer on a solid support;
- (c) obtaining one or more biomolecule(s) that includes one or more reactive site(s) capable of 2 + 2 photocycloaddition; and
- (d) contacting the product of step (a) with the product of step (b) under conditions sufficient for 2 + 2 photocycloaddition to occur such that said crosslinked polyacrylamide hydrogel or hydrogel array comprising one or more attached biomolecule(s) is obtained.

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28. The method of claim 27, wherein the reactive site(s) present on the polyacrylamide reactive prepolymer and the reactive site(s) present on the biomolecule(s) are selected from the group consisting of dimethyl maleimide, maleimide, thymine, polythymine, acrylate, cinnamate and citraconimide.

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29. The method of claim 27, wherein said biomolecule(s) comprise a nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

20 30. A method for preparing a solid support comprising one or more attached biomolecule(s), said method comprising:

- (a) treating said solid support with a coupling agent to attach one or more amine group(s) to the surface of said solid support;
- (b) attaching to said solid support by said amine group(s) one or more reactive site(s) capable of 2 + 2 photocycloaddition;
- (c) obtaining one or more biomolecule(s) that includes one or more reactive site(s) capable of 2 + 2 photocycloaddition; and
- (d) contacting the product of step (b) with the product of step (c) under conditions sufficient for 2 + 2 photocycloaddition to occur such that said solid support comprising one or more attached biomolecule(s) is obtained.

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31. The method of claim 30, wherein the reactive site(s) present on the solid support and the reactive site(s) present on the biomolecule(s) are selected from the group consisting of dimethyl maleimide, maleimide, thymine, polythymine, acrylate, cinnamate and citraconimide.

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32. The method of claim 30, wherein said biomolecule(s) comprise a nucleic acid fragment containing less than about 1000 nucleotides, and further optionally comprise a spacer region.

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33. The method of claim 30, wherein the solid support is a material selected from the group consisting of nylon, polystyrene, glass, latex, polypropylene, and activated cellulose.

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34. The method of claim 30, wherein the solid support is a material selected from the group consisting of a bead, membrane, microwell, centrifuge tube, and slide.